

## **NUCLEAR DENSITY/MOISTURE METERS**

### **63-06.0100 GENERAL**

The Nuclear Density-Moisture Gauge is a critical piece of equipment in the areas of field testing and job control. The nuclear density gauge the standard the Kentucky Transportation Cabinet will accept the density of soil, certain aggregate applications, and certain bituminous applications. The nuclear density gauge utilizes radioactive sources and is potentially dangerous if used improperly. The rules and regulations described herein are based on Federal guidelines.

Kentucky Administrative Radiation Regulations *902 KAR 100* applies to the possession or use of radioactive material and is administered by the Cabinet for Public Health – Radiation Control Branch under the authority of *KRS 211.842 to 211.848*.

The following guidelines, instructions, and information conform to the applicable provisions of *902 KAR 100*. It is mandatory that all personnel who use, transport, or handle a nuclear density gauge, or those who authorize the use, transportation, or handling of a nuclear density gauge be thoroughly familiar with these requirements.

It is important that personnel in all offices, from the Central Office Division of Construction through the District Office to the Project Engineer's Office be knowledgeable of and able to fulfill their responsibilities with respect to the care and handling of nuclear density gauges. The safety and welfare of the operator and the general public are paramount and take precedence over all other considerations. The operator is urged to take all training serious and to be aware of, not only their own responsibilities, but also those of their supervisor insofar as they impact the nuclear density gauge and its use. The nuclear gauge responsibilities of each level in the Division of Construction are listed herein. A Thermoluminescent Dosimeter (TLD) badge will be issued to the gauge operator. Each badge is personalized with the gauge operator's name. The TLD badge will monitor the radiation and neutron exposure the TLD badge receives. The TLD badge shall be worn on the torso outside the outer-most layer of clothing.

### **63-06.0200 RESPONSIBILITIES**

**.0210 Central Office, Division of Construction** - The Central Office, Division of Construction, is licensed under the provisions of *902 KAR 100* to possess and use nuclear density gauges. All gauges are assigned and issued by the Division of Construction under the authority of this license. The Division of Construction is, therefore, responsible for:

- Receiving all nuclear density-moisture gauges from the factory, checking calibration of each gauge prior to assignment to district personnel and the return of gauges to the factory for maintenance, updating, and leak testing.
- Assignment and issuance of gauges to the various districts according to workload. These gauges may be recalled at any time and reassigned at the discretion of the Division of Construction.
- Issuing TLD badges to the various districts for use by gauge operators and

returning them to the manufacturer's electronic laboratories for analysis. This radiation exposure is kept in a record in the Division of Construction for audit or review at any time.

- Maintaining a list of operators certified for operation of gauges.
- Providing training in the use of nuclear density gauges.
- Insuring that information pertaining to proper safety procedures is distributed and made available to all involved personnel.
- Perform internal audits to ensure procedures are followed.

**.0220 District Office, Construction** - The Radiation Safety Officer is responsible for:

- Assignment of gauges to Project Engineers and crews.
- The quarterly collection of exposed TLDs from the Project Engineer's offices and dispensing of the replacements. It is necessary that the District return the collected TLDs to the Central Office, Division of Construction within ten days after the receipt of the replacements.
- Making training accessible to and/or providing training to the Project Engineers and gauge operators.
- Distribution of safety related information to involved personnel and follow-up reviews to see that this information is utilized
- Supervising the use and handling of the gauges and insuring that safety procedures are followed.
- Periodic field checks of the Project Engineers offices and the gauge operators to see that proper records are being maintained and correct safety procedure are followed.
- Insuring that each Project Engineer has enough trained operators, sufficient nuclear gauges, and adequate transportation and storage capabilities available to meet his inspection responsibilities.

**.0230 Project Engineer** - The Project Engineer is responsible for:

- Have received training in emergency procedures and recommended procedures for use.
- Having a thorough knowledge of the use, care, storage, and transportation of the nuclear gauge and a reasonable knowledge and understanding of the operator's manual.
- Insuring that he has an adequate number of trained operators available to meet the responsibilities of his office. *Note: Temporary employees are not to be used in this job.*
- Impressing upon the operators that the cost of the gauges (near \$5,000) makes the gauge one of the most expensive pieces of equipment assigned to the office and that its function makes it one of the most critical.
- Assignment of responsible personnel that have been certified to operate the gauges. It is also very important that the operator be well informed in maintenance and care of the gauge. Careless handling should not be tolerated.

- Seeing that proper warning labels are in place on shipping containers used for transporting gauges and also in the place of storage.
- Obtaining or receiving replacement TLDs from the District Office, retrieving exposed TLDs from the operators, and returning them to the District Office. This must be done in time for the District Office to return the monitors to the Division of Construction within ten days.
- Insuring that no individual operates the nuclear gauge without properly using their own TLD Badge.

**.0240 Operator** - The operator shall:

- Have been certified for gauge operation, knowledge of maintenance, storage, transporting, and operation of the gauge.
- Have received training in biological effects and radiological health requirements.
- Have received training in emergency procedures and recommended procedures for use.
- Have read, understood, and be willing to comply with the appropriate operator's manual.
- Stay informed as to density testing requirements and procedures by studying job specifications, sampling and testing manuals, and by seeking advice from knowledgeable individuals.
- Be at least 19 years old.

All operators shall have a minimum of four hours training prior to being assigned a TLD and being allowed to operate the gauges.

**63-06.0300 NUCLEAR GAUGE**

**.0310 Care of Gauge** - The gauge shall be kept clean and preventive maintenance shall be performed frequently. After use in a dusty area, the gauge should be wiped with a clean dry cloth. If the gauge is used on DGA or plastic concrete, retract source to shielded position so the bottom may be wiped clean with a damp cloth after each test to prevent build-up of material on the bottom of the gauge.

When in use on bituminous concrete, care shall be taken to remove all sticky material from the gauge base. Various solvents may be used to soften and remove asphalt. Mineral spirits and WD 40 are recommended by the manufacturer. Use sparingly and do not get the solvents on the top shell of the gauge. Stubborn deposits may require the use of a putty knife but be careful not to mar the base.

The gauge shall be handled the same as any electronic instrument. Do not drop or jar unnecessarily. The gauge is sturdy but unnecessary roughness may cause gauge performance to be compromised. The nuclear density gauges are moisture resistant, however, care should be exercised to keep them as dry as possible. Always lock the gauge in a secure place when not in use.

**.0320 Storage of Gauge** - When not in use, the gauge shall be stored in an unused room or location at least fifteen feet away from a permanent work station and kept under redundant lock and key at all times. The storage area for the gauge must be dry, ventilated, and secure. Appropriate warning signs shall be posted in areas where the gauge is stored. When radiation warning signs are posted, place the following note to firemen: *"All radioactive materials are sealed and in tungsten steel containers. Premises may be entered under emergency conditions."* This note will have to be prepared by the Project Engineer's office. It should be in **bold** letters and placed in a prominent location. Use as many as deemed necessary.

**.0330 Transportation of Nuclear Gauge** - Extreme care and precautions shall be exercised in the transportation of nuclear gauges, especially from the storage site to place of operations. These precautions shall include, but not be limited to, the following:

- Radiation yellow II warning signs shall be permanently affixed to transport cases.
- Gauge shall be under lock and key at all times when unattended.
- Gauge shall be placed in padded container, properly locked, at all times while in transit.
- When transporting a gauge in a pickup truck, locate the padded container in the bed of the truck next to the tail gate. Make sure it is properly tied down and locked.
- Never transport a gauge in the cab of a truck or in the passenger area of a sedan. If the mode of transportation is a suburban, crew cab, or similar type vehicle, the gauge may be transported in the rear seat provided it is at least four feet from all passengers and able to be locked to the vehicle.
- Never transport a gauge without transport papers for the appropriate brand of gauge. The current copies can be obtained from your District RSO. These documents are as follows:

- a. Emergency Procedures (Example Exhibit 63-6-1)
- b. Bill of Lading, (Example Exhibit 63-6-2)
- c. Current Radiation Safety License, TC 95-2 (Exhibit 63-6-3)

These documents are included with every gauge and should be stored in the case. They are to be removed from the case and carried in the cab of the truck within arms-reach of the driver. These documents should be updated annually or whenever there are changes in personnel.

**.0340 Gauge Operation and Troubleshooting** – Each gauge should have an operators manual or users guide. Gauge operation is covered in this document and also in the hands-on training classes provided by the Cabinet. If a gauge is lacking a

manual, notify your District RSO with your gauge make and model and they will get a replacement copy to you. In case of gauge malfunction or failure, follow the recommended troubleshooting procedures outlined in the operator's manual provided with the gauge. If there is an issue that cannot be resolved or diagnosed at the operator level, contact the District RSO.

#### **63-06.0400 THERMOLUMINESCENT DOSIMETER (TLD)**

*NEVER STORE TLD MONITORS IN CLOSE PROXIMITY TO NUCLEAR GAUGES, MICROWAVE RADIATION, X-RAYS, OR DIRECT SUNLIGHT.*

TLDs are not transferable and must only be used by the person it is assigned. All TLDs are assigned with the operator's name imprinted on the badge. TLDs are used to measure exposure to occupational radiation. When not being worn, the TLD should be stored in a neutral area. Avoid badge contact with washing machines, TV's, medical x-rays, computers, or contact with heat. Leave the TLD at the office, Do not take the TLD home. Printouts containing data showing TLD distribution along with replacement TLDs are sent to each District Office quarterly. Each district will keep a copy of the printout for their records. See Exhibit 63-6-4 for an example of the printout. The manufacturer provides the Division of Construction a record by district of all individuals listed in the above discussed printout. This record covers a calendar year and is updated each quarter. It provides the following information:

- This record includes radiation exposure readout from the used TLDs for the most current expired quarter.
- This record carries a cumulative total of radiation exposure for the current calendar year as well as permanent exposure for each individual.
- This record should be displayed in the workplace and is to be made available at any time upon request. In addition, should this record show that an operator received an unusual dose radiation of during the year, he will receive immediate notification.

When returning the TLDs, include a note of explanation on the printout for any TLD lost or destroyed in the field. Indicate all changes in requests including appropriate names on the printout. Additional or replacement TLDs may be obtained at any time. There is no need to wait to the end of a quarter. Requests may be made over the telephone with confirmation in writing.

#### **63-06.500 NUCLEAR DENSITY TESTS**

The use of a nuclear density gauge imposes responsibilities on a Project Engineer in addition to those of safety and care which have been previously mentioned. Regulations require that daily logs be kept as to its use and maintenance. The many and varied uses of the nuclear gauge also mandate that different forms be utilized to take full advantage of versatility of the nuclear density gauge. Both the Project Engineer and the Operator should be thoroughly familiar with these forms and their function. Following is a list of these forms along with a short description of their use.

- **Nuclear Meter Daily Log Sheet, Form TC 63-46** (Exhibit 63-6-5). This log shall be kept with each nuclear gauge. The disposition of the gauge must be shown for each day whether the gauge is used or not. Submit to the District Construction Office the first and 15th of each month. The District Construction Office shall submit to the Division of Construction as soon as all logs are received from assigned gauges.
- **Moisture Density Test Report, Form TC 63-47** (Exhibit 63-6-6). This particular form is intended to be used with Soils, DGA, and CSB (Crushed Stone Base). It has been revised to meet the requirements of KM 64-512 and this procedure should be familiar to the inspectors using this form. It is intended the user input the information electronically and be uploaded into SM Materials.

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**TABLE OF EXHIBITS**

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**CHAPTER SIX**

<b><u>TITLE</u></b>	<b><u>EXHIBIT NUMBER</u></b>
Nuclear Gauge Emergency Procedures	63-6-1
Bill of Lading	63-6-2
Current Radiation Safety License	63-6-3
Example of a TLD Report	63-6-4
Nuclear Meter Daily Log Sheet – Form TC 63-46	63-6-5
Moisture Density Test Report – Form TC 63-47	63-6-6

## NUCLEAR DENSITY METER EMERGENCY PROCEDURES

In the event of physical damage to a gauge, the following steps:

- Cordon off an area of 15' in radius to prevent entry by unauthorized people or public.
- If a vehicle is involved, it must not leave the area until extent of contamination has been determined.
- Make a visual inspection of the gauge to determine if damage has occurred to the source housing or shield.
- As soon as possible, after the site has been stabilized and under control, notify:
  - KYTC Emergency (502) 564-2080
  - Div. Of Emergency Management 800-255-2587
  - Transportation Cabinet, Division of Construction  
Jeremiah Littleton (502) 564-4780, Cell (502) 229-8626
  - District 1, RSO (270) 898-2431 Brad Turner
  - District 2, RSO (270) 824-7080 Bruce Hardesty
  - District 3, RSO (270) 746-7898 Dana Eicher
  - District 4, RSO (270) 766-5066 Tim Wilson
  - District 5, RSO (502) 367-6411 Andrew Bland
  - District 6, RSO (859) 341-2700 Todd Riley
  - District 7, RSO (859) 246-2355 Tim Preston
  - District 8, RSO (606) 677-4017 Steve Cravens
  - District 9, RSO (606) 845-2551 Mickey Reffitt
  - District 10, RSO (606) 666-8841 Willie Griffith
  - District 11, RSO (606) 598-2145 Les Nicholson
  - District 12, RSO (606) 433-7791 Rick Adkins
  - Materials RSO (502) 564-3160 Chuck Radcliff
- In the event that a gauge is lost or stolen, The Radiation Safety Officer (RSO) listed above must be notified immediately.



## TRANSPORTATION CABINET

Frankfort, Kentucky 40622

[www.kentucky.gov](http://www.kentucky.gov)

### BILL OF LADING

Shipper: Kentucky Transportation Cabinet  
Division of Construction  
200 Mero Street, West Wing-3<sup>rd</sup> Floor  
Frankfort, KY 40622

USA DOT 7A TYPE A  
RADIOACTIVE MATERIAL – TYPE A PACKAGE  
SPECIAL FORM, NONFISSILE OR FISSILE-EXCEPTED,  
UN 3332, RQ

Cs-137 0.37 GBq (10mCi)  
Am-241/Be 1.48 GBq (40 mCi)

RADIOACTIVE YELLOW LABEL II, TI = 0.2

\*\*\*\*\*EMERGENCY CONTACT\*\*\*\*\*

KYTC EMERGENCY 502-564-2080  
DIVISION OF EMERGENCY MANAGEMENT 800-255-2587  
HUMBOLDT 800-255-3924 or 919-832-6509  
RADIATION HEALTH 502-564-3700  
JEREMIAH LITTLETON 502-564-4780 or 502-229-8626

This is to certify that the above named materials are properly classified, described, packaged marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Shipper: Kentucky Transportation Cabinet  
Division of Construction

CABINET FOR HEALTH SERVICES  
COMMONWEALTH OF KENTUCKY  
RADIOACTIVE MATERIAL LICENSE

Exhibit 63-6-3

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1. LICENSEE AND 2. ADDRESS

KY TRANSPORTATION CABINET  
200 MERO STREET 3RD FL W. WING  
STATE OFFICE BLDG  
FRANKFORT, KY 40622

ATTENTION: JEREMIAH LITTLETON, PE  
TELEPHONE: 502-564-4780

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PURSUANT TO KRS 211.842 ET SEQ., THE KENTUCKY CABINET FOR HUMAN  
RESOURCES REGULATIONS, 902 KAR 100, AND IN RELIANCE ON STATEMENTS  
AND REPRESENTATIONS HERETOFORE MADE BY THE LICENSEE, A LICENSE IS  
HEREBY ISSUED TO RECEIVE, ACQUIRE, OWN, POSSESS AND TRANSFER  
RADIOACTIVE MATERIAL LISTED BELOW; AND TO USE SUCH RADIOACTIVE  
MATERIAL FOR THE PURPOSE(S) AND AT THE PLACE(S) DESIGNATED BELOW.  
THIS LICENSE IS SUBJECT TO ALL APPLICABLE RULES, REGULATIONS, AND  
ORDERS OF THE CABINET FOR HEALTH SERVICES, NOW OR HEREINAFTER IN  
EFFECT AND TO ANY CONDITIONS SPECIFIED BELOW.  
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3. LICENSE NUMBER: 201-086-51  
AMENDMENT NO. 63  
4. EXPIRATION DATE: JUNE 30, 2008  
5. REVIEWER: 46  
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6. LICENSED MATERIAL	7. FORM	8. POSSESSION LIMIT
A. CESIUM 137	A. SEALED SOURCE (TROXLER DWG. A-102112)	A. NO SINGLE SOURCE TO EXCEED 9 MILLI- CURIES
B. AMERICIUM 241	B. SEALED SOURCE (TROXLER DWG. A-102451)	B. NO SINGLE SOURCE TO EXCEED 44 MILLI- CURIES

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C. AMERICIUM 241	C. SEALED SOURCE (TROXLER DWG. A-100608)	C. NO SINGLE SOURCE TO EXCEED 100 MILLI- CURIES
D. CESIUM 137	D. SEALED SOURCE (HUMBOLT MODEL 2200064)	D. NO SINGLE SOURCE TO EXCEED 11 MILLI- CURIES
E. AMERICIUM 241	E. SEALED SOURCE (HUMBOLT MODEL 2200067)	E. NO SINGLE SOURCE TO EXCEED 44 MILLI- CURIES

9. AUTHORIZED USE

- A TO BE USED IN TROXLER MODEL 3400 SERIES OR 4640 SERIES MOISTURE/DENSITY GAUGE TO MEASURE PROPERTIES OF CONSTRUCTION MATERIALS.
- B. TO BE USED IN TROXLER MODEL 3400 SERIES MOISTURE/DENSITY GAUGE TO MEASURE PROPERTIES OF CONSTRUCTION MATERIALS.
- C. TO BE USED IN TROXLER MODEL 3241 SERIES ASPHALT CONTENT GAUGE TO MEASURE BITUMINOUS MIXTURES.
- D. AND E. TO BE USED IN HUMBOLT SCIENTIFIC MODEL 5001 COMPACTION CONTROL GAUGES TO MEASURE PROPERTIES OF CONSTRUCTION MATERIALS.

CONDITIONS:

- 10. THE LICENSEE SHALL COMPLY WITH THE PROVISIONS OF THE KENTUCKY CABINET FOR HEALTH SERVICES ADMINISTRATIVE RADIATION REGULATIONS, 902 KAR 100.
- 11. RADIOACTIVE MATERIAL MAY BE STORED AT:
  - A. THE LICENSEE'S ADDRESS STATED IN ITEM 2.
  - B. THE LICENSEE'S DISTRICT OFFICES AS APPROVED BY THE RADIATION PROTECTION OFFICER.
  - C. 1227 WILKINSON BOULEVARD, FRANKFORT, KENTUCKY 40601

CABINET FOR HEALTH SERVICES  
COMMONWEALTH OF KENTUCKY  
RADIOACTIVE MATERIAL LICENSE

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RADIOACTIVE MATERIAL MAY BE USED AT TEMPORARY JOB SITES, IN AREAS NOT UNDER EXCLUSIVE FEDERAL JURISDICTION, ANYWHERE IN THE COMMONWEALTH OF KENTUCKY WHERE THE CABINET MAINTAINS JURISDICTION FOR REGULATING THE USE OF RADIOACTIVE MATERIAL. (THIS CONDITION DOES NOT PROHIBIT USE IN OTHER STATES UNDER RECIPROCITY PRIVILEGES WHICH MAY BE GRANTED BY THE REGULATORY AGENCY HAVING JURISDICTION.)

12. RADIOACTIVE MATERIAL SHALL BE USED BY, OR UNDER THE SUPERVISION AND IN THE PHYSICAL PRESENCE OF JEREMIAH LITTLETON, P.E. ALTERNATIVELY, RADIOACTIVE MATERIAL MAY BE USED BY INDIVIDUALS WHO HAVE BEEN TRAINED AS SPECIFIED IN APPLICATION FILED MAY 18, 2004, AND HAVE BEEN APPROVED IN WRITING BY THE RADIATION SAFETY OFFICER. THE LICENSEE SHALL MAINTAIN RECORDS OF THE TRAINING RECEIVED BY INDIVIDUALS DESIGNATED AS USERS FOR INSPECTION BY THE CABINET FOR FIVE YEARS FOLLOWING THE LAST USE OF RADIOACTIVE MATERIAL BY THE INDIVIDUAL. THIS TRAINING PROGRAM IS APPLICABLE ONLY TO INDIVIDUALS WHO SHALL USE LICENSED MATERIAL UNDER THE AUTHORITY OF THIS LICENSE.

13. THE RADIATION SAFETY OFFICER FOR THE ACTIVITIES AUTHORIZED BY THIS LICENSE IS JEREMIAH LITTLETON, P.E. .

NOTWITHSTANDING THE PERIODIC LEAK TEST REQUIRED BY 902 KAR 100:060, SUCH REQUIREMENT DOES NOT APPLY TO SOURCES THAT ARE STORED AND NOT BEING USED. THE SOURCES EXCEPTED FROM THIS TEST SHALL BE TESTED FOR LEAKAGE PRIOR TO ANY USE OR TRANSFER TO ANOTHER PERSON UNLESS THEY HAVE BEEN TESTED WITHIN SIX MONTHS.

14. SEALED SOURCES CONTAINING RADIOACTIVE MATERIAL SHALL NOT BE OPENED OR REMOVED FROM THEIR RESPECTIVE SOURCE HOLDERS BY THE LICENSEE.
15. ANY CLEANING, MAINTENANCE OR REPAIR OF THE GAUGE(S) INVOLVING REMOVAL OF THE SOURCE ROD FROM THE DEVICES OR REMOVAL OR DISMANTLING OF SHIELDING SHALL BE PERFORMED ONLY BY THE MANUFACTURER OR BY OTHER PERSONS SPECIFICALLY AUTHORIZED BY THE CABINET, THE U.S. NUCLEAR REGULATORY COMMISSION OR AN AGREEMENT STATE TO PERFORM SUCH SERVICES.
16. EACH PORTABLE GAUGE SHALL HAVE A LOCK OR OUTER LOCKED CONTAINER DESIGNED TO PREVENT UNAUTHORIZED OR ACCIDENTAL REMOVAL OF THE SEALED SOURCE FROM ITS SHIELDED POSITION. THE GAUGE OR ITS CONTAINER MUST BE LOCKED WHEN IN TRANSPORT, STORAGE OR WHEN NOT UNDER THE DIRECT SURVEILLANCE OF AN AUTHORIZED USER.

CABINET FOR HEALTH SERVICES  
COMMONWEALTH OF KENTUCKY  
RADIOACTIVE MATERIAL LICENSE

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17. THE LICENSEE SHALL CONDUCT A PHYSICAL INVENTORY EVERY SIX (6) MONTHS TO ACCOUNT FOR ALL SEALED SOURCES RECEIVED AND POSSESSED UNDER THE LICENSE. THE RECORDS OF THE INVENTORIES SHALL BE MAINTAINED FOR FIVE (5) YEARS FROM THE DATE OF THE INVENTORY FOR INSPECTION BY THE CABINET, AND SHALL INCLUDE THE RADIONUCLIDES, QUANTITIES, MANUFACTURER'S NAME AND MODEL NUMBERS, LOCATION OF SEALED SOURCES, AND THE DATE OF THE INVENTORY.
  18. THE LICENSEE MAY TRANSPORT RADIOACTIVE MATERIAL, OR DELIVER RADIOACTIVE MATERIAL TO A CARRIER FOR TRANSPORT, IN ACCORDANCE WITH THE PROVISIONS OF 902 KAR 100:070, AND OTHER DEPARTMENTS OF THE COMMONWEALTH OF KENTUCKY HAVING JURISDICTION.
  19. IN ADDITION TO THE POSSESSION LIMITS IN ITEM 8, THE LICENSEE SHALL FURTHER RESTRICT THE POSSESSION OF RADIOACTIVE MATERIAL TO QUANTITIES BELOW THE MINIMUM LIMIT SPECIFIED IN 902 KAR 100:042, SECTION 11, FOR ESTABLISHING DECOMMISSIONING FINANCIAL ASSURANCE.
  20. EXCEPT AS SPECIFICALLY PROVIDED OTHERWISE IN THIS LICENSE, THE LICENSEE SHALL CONDUCT ITS PROGRAM IN ACCORDANCE WITH THE STATEMENTS, REPRESENTATIONS, AND PROCEDURES CONTAINED IN THE DOCUMENTS, INCLUDING ANY ENCLOSURES, LISTED BELOW. THE CABINET FOR HEALTH SERVICES REGULATIONS, 902 KAR 100, SHALL GOVERN UNLESS STATEMENTS, REPRESENTATIONS, AND PROCEDURES IN THE LICENSEE'S APPLICATION AND CORRESPONDENCE ARE MORE RESTRICTIVE THAN THE REGULATION.
    - A. APPLICATION DATED MAY 18, 2004, SIGNED BY DEXTER NEWMAN, DIRECTOR OF CONSTRUCTION.
    - B. LETTERS DATED:
      1. JULY 8, 2004, SIGNED BY JANICE EVANS FLYGSTAD, RSO.
      2. SEPTEMBER 21, 2005, SIGNED BY JANICE FLYGSTAD, RSO.
      3. JUNE 23, 2006, SIGNED BY JANICE M. FLYGSTAD, RSO.
      4. SEPTEMBER 11, 2006, SIGNED BY JEREMIAH LITTLETON, P.E.



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MANAGER  
RADIATION HEALTH BRANCH

MARK D. BIRDWHISTELL

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SECRETARY  
CABINET FOR HEALTH AND FAMILY  
SERVICES

DATE ISSUED MAY 30, 2007

FACILITY ID: 21600

REPORT DATE: 06/14/07

FACILITY: KY. DOT-CENTRAL OFFICE  
 ATTENTION: JANICE EVANS  
 200 Mero St - West Wing  
 3rd Fl. Construction  
 FRANKFORT, KY 40622



**TROXLER RADIATION MONITORING SERVICES**  
*A Division of Troxler Electronic Laboratories, Inc.*  
 3008 Cornwallis Road • Box 12057 • RTP, NC 27709  
 Tel: 877-876-9537 ext 2226 • Fax: 919-485-2250

Exhibit 63-6-4

Accredited by the National Institute of  
 Standards and Technology through  
 NVLAP for whole body dosimetry.

NVLAP lab code: 100559-0

Technical Director: S. A. Browne

## RADIATION EXPOSURE REPORT

NAME	DOSIMETER ID	BADGE TYPE	WEAR TERM	EXP TYPE	EXPOSURE TO BADGE (MILLIREM)			CUMULATIVE TOTALS (MILLIREM)						NOTES	SSN	BIRTHDATE
					SHALLOW	DEEP	EYE	CALENDAR YEAR			LIFETIME					
								SHALLOW	DEEP	EYE	SHALLOW	DEEP	EYE			
Period Beginning: 01/01/07																
Control Badge	424004	C	Q													
BOOKER, TREVOR		W	Q		<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL		XXX-XX-XX	
CRISWELL, STEVE		W	Q		<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL		XXX-XX-XX	
LITTLETON, JEREMI		W	Q		<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL		XXX-XX-XX	
PAUL, M.		W	Q		<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	359	343	276		XXX-XX-XX	
QUARLES, D.		W	Q		<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	251	212	210		XXX-XX-XX	
RADCLIFF, CHUCK		W	Q		<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	<MDL		XXX-XX-XX	
WOOLDRIDGE, G.		W	Q		<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	369	350	223		XXX-XX-XX	
YOUNG, D.		W	Q		<MDL	<MDL	<MDL	<MDL	<MDL	<MDL	313	282	271		XXX-XX-XX	

### TERMS AND EXPLANATIONS

#### Badge Type

A = Area badge  
 C = Control badge  
 E = Extremity badge  
 W = Whole body badge

#### Exp Type

G = Gamma  
 B = Beta  
 X = X-ray  
 N = Neutron

#### Dose Definitions

<MDL = Dose is less than minimum detectable level  
 Shallow = Dose equivalent at 7 mg/cm<sup>2</sup> tissue depth  
 Eye = Dose equivalent at 300 mg/cm<sup>2</sup> tissue depth  
 Deep = Dose equivalent at 1000 mg/cm<sup>2</sup> tissue depth

#### Notes

MC = Missing control badge. Default background used.  
 HC = High control badge reading.  
 LB = Badge returned > 6 months after period end.  
 DB = Damaged badge  
 AR = Low reading

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

SOURCE SPECIFICATIONS:

TROXLER GAMMA SOURCE: 8+/-mCi CESIUM 137  
TROXLER NEUTRON SOURCE: 40+/- mCi AMERICIUM-241: BE  
HUMBOLT GAMMA SOURCE: 10 mCi (NOM) CESIUM 137  
HUMBOLT NEUTRON SOURCE: 40 mCi (NOM) AMERICIUM-241: BE

DISTRICT NO: \_\_\_\_\_

GAUGE SERIAL NO: \_\_\_\_\_

[illegible]

KENTUCKY TRANSPORTATION CABINET  
Department of Highways  
Division of Materials

Discipline DENSITY  
Version v1.0

Material Type	ALL	Material Code	ZZZZZ				
Sample Date		Producer/Supplier Code					
		Sample Unit					
Contract		Project		Line Item Number		Represented Quantity	
QC Tester (SM User ID)							
QA Tester (SM User ID)							
Sample ID		Intended Use					
District							
Crew							
Remarks							

Contractor Entries  
KYTC Entries  
Read-Only

## Moisture-Density Test Report

<b>METER #</b>		<b>ROAD NAME</b>	
<b>MODEL #</b>		<b>ROUTE #</b>	
		<b>COUNTY</b>	

Note: For DGA &amp; CSB, test section

2500 SY (2100 SM)

5 equal sections of 500 SY (420 SM) @ random locations

SiteManager Sample ID					
Roll/Sublot #	1	2	3	4	5
Station #					
CL Offset Distance					
Latitude					
Longitude					
Elevation					
DGA or CSB or SOIL	ALL	ALL	ALL	ALL	ALL
Standard Density Count					
Standard Moisture Count					
QC or QA	QC	QC	QC	QC	QC
Test Depth					
Density Count					
Wet Density (lb/cf)					
Moisture Count					
Moisture (lb)					
Dry Density (lb/cf)					
% Moisture					
Target Density (lb/cf)*					
Optimum Moisture (%)					
% Compaction**					
Required % Compaction	95	95	95	95	95
Moisture Correction (%)					
Pass or Fail					
QA validation of QC tests (P or F)***					

Avg. 5 test

98

95

### Plus 4 Material correction from KM 64-512

Proctor Value from Plans					
Corrected Proctor Density from KM 64-512					
QC Tests Witnessed by KYTC					

\*Proctor from Project Plans or Corrected Proctor

\*\* 95% minimum individual test, average of 5 test 98%

\*\*\* The QA test results must be within +/- 5 lb/cu ft of the Wet Density and +/- 1% of the Moisture Content for all four (4) QC tests associated with it.

Contractor Entries  
 KYTC Entries  
 Read-Only